Minimizing the Food Safety Concerns with Aquaculture Products in Indonesia: How Best to Train and Educate Farmers

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OUTLINE

• Overview of Current Aquaculture Business in Indonesia
• Aquaculture Policy in Indonesia
• Efforts to Train and Educate Farmers
Small-scale Enterprises Predominate:
- 89% Brackish-water farms < 10 Ha
- 86% Fresh-water pond farms < 0.5 Ha

Numerous suppliers

Key Characteristics:
- Under capitalized → cannot fulfill market quotas (demand)
- Low technical skills/knowledge → low productivity/quality
- Poorly managed → weak bargaining position

Challenge for implementing food safety on aquaculture product
Key Strengths:

- Resilient to economic fluctuations;
- High capacity to provide employment;
- No use/limited use of chemical and biological substances and pharmaceuticals.
<table>
<thead>
<tr>
<th>Aquaculture Type</th>
<th>Area (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marine Culture</td>
<td>87,792</td>
</tr>
<tr>
<td>Brackishwater ponds</td>
<td>613,175</td>
</tr>
<tr>
<td>Freshwater ponds</td>
<td>241,891</td>
</tr>
<tr>
<td>Cages</td>
<td>207</td>
</tr>
<tr>
<td>Floating cage net</td>
<td>736</td>
</tr>
<tr>
<td>Paddy field</td>
<td>127,944</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1,071,745</strong></td>
</tr>
</tbody>
</table>
## Indonesian Aquaculture production, 2004-2009

*Unit: ton*

<table>
<thead>
<tr>
<th>No.</th>
<th>Commodity</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009 *)</th>
<th>Annual Growth Rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>1.468.610</td>
<td>2.163.674</td>
<td>2.682.596</td>
<td>3.193.565</td>
<td>3.855.200</td>
<td>4.780.100</td>
<td>27,014</td>
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<tr>
<td>1</td>
<td>Seaweed</td>
<td>410.570</td>
<td>910.636</td>
<td>1.374.462</td>
<td>1.728.475</td>
<td>2.145.060</td>
<td>2.574.000</td>
<td>48,517</td>
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<tr>
<td>2</td>
<td>Shrimp</td>
<td>238.857</td>
<td>280.629</td>
<td>327.610</td>
<td>358.925</td>
<td>409.590</td>
<td>348.100</td>
<td>8,578</td>
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<tr>
<td>3</td>
<td>Tilapia</td>
<td>97.116</td>
<td>148.249</td>
<td>169.390</td>
<td>206.904</td>
<td>291.037</td>
<td>378.300</td>
<td>31,941</td>
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<tr>
<td>4</td>
<td>Milkfish</td>
<td>241.438</td>
<td>254.067</td>
<td>212.883</td>
<td>263.139</td>
<td>277.471</td>
<td>291.300</td>
<td>4,612</td>
</tr>
<tr>
<td>5</td>
<td>Common Crap</td>
<td>192.462</td>
<td>216.920</td>
<td>247.633</td>
<td>264.349</td>
<td>242.322</td>
<td>254.400</td>
<td>6,054</td>
</tr>
<tr>
<td>6</td>
<td>Catfish</td>
<td>51.271</td>
<td>69.386</td>
<td>77.272</td>
<td>91.735</td>
<td>114.371</td>
<td>200.000</td>
<td>32,992</td>
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<tr>
<td>7</td>
<td>Pangasius</td>
<td>23.962</td>
<td>32.575</td>
<td>31.490</td>
<td>36.755</td>
<td>102.021</td>
<td>132.600</td>
<td>51,375</td>
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<tr>
<td>8</td>
<td>Gurame</td>
<td>23.758</td>
<td>25.442</td>
<td>28.710</td>
<td>35.708</td>
<td>36.636</td>
<td>38.500</td>
<td>10,399</td>
</tr>
<tr>
<td>9</td>
<td>Grouper</td>
<td>6.552</td>
<td>6.493</td>
<td>4.021</td>
<td>8.035</td>
<td>5.005</td>
<td>5.300</td>
<td>5,808</td>
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<tr>
<td>10</td>
<td>Seabass</td>
<td>4.663</td>
<td>2.935</td>
<td>2.183</td>
<td>4.418</td>
<td>4.371</td>
<td>4.600</td>
<td>8,776</td>
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<tr>
<td>11</td>
<td>Others</td>
<td>177.961</td>
<td>216.342</td>
<td>206.942</td>
<td>195.122</td>
<td>227.317</td>
<td>553.000</td>
<td>34,257</td>
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</tbody>
</table>

*). Estimated value
## Production Target on Aquaculture, 2010 - 2014

<table>
<thead>
<tr>
<th>No.</th>
<th>Commodity</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>Annual Growth rate (%)</th>
<th>Growth Rate from 2009 to 2014 (%)</th>
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</thead>
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<tr>
<td>2</td>
<td>Catfish</td>
<td>12</td>
<td>27</td>
<td>38</td>
<td>38</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Pangasius</td>
<td>2.672.800</td>
<td>3.504.200</td>
<td>5.100.000</td>
<td>7.500.000</td>
<td>10.000.000</td>
<td>32</td>
<td>389</td>
</tr>
<tr>
<td>4</td>
<td>Catfish</td>
<td>495.600</td>
<td>749.000</td>
<td>1.146.000</td>
<td>1.777.000</td>
<td>2.783.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Clarias sp</td>
<td>225.000</td>
<td>383.000</td>
<td>651.000</td>
<td>1.107.000</td>
<td>1.883.000</td>
<td>70</td>
<td>1.420</td>
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<tr>
<td>6</td>
<td>Tilapia</td>
<td>270.600</td>
<td>366.000</td>
<td>495.000</td>
<td>670.000</td>
<td>900.000</td>
<td>35</td>
<td>450</td>
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<tr>
<td>7</td>
<td>Catfish</td>
<td>491.800</td>
<td>639.300</td>
<td>850.000</td>
<td>1.105.000</td>
<td>1.242.900</td>
<td>27</td>
<td>329</td>
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<tr>
<td>8</td>
<td>Catfish</td>
<td>349.600</td>
<td>419.000</td>
<td>503.400</td>
<td>604.000</td>
<td>700.000</td>
<td>19</td>
<td>240</td>
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<tr>
<td>9</td>
<td>Catfish</td>
<td>400.300</td>
<td>460.000</td>
<td>529.000</td>
<td>608.000</td>
<td>699.000</td>
<td>15</td>
<td>201</td>
</tr>
<tr>
<td>10</td>
<td>Tiger prawn</td>
<td>109.140</td>
<td>115.720</td>
<td>128.700</td>
<td>148.500</td>
<td>188.000</td>
<td>13</td>
<td>182</td>
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<tr>
<td>11</td>
<td>Vannamei</td>
<td>291.160</td>
<td>344.280</td>
<td>400.300</td>
<td>459.500</td>
<td>511.000</td>
<td>16</td>
<td>209</td>
</tr>
<tr>
<td>12</td>
<td>Common carp</td>
<td>267.100</td>
<td>280.400</td>
<td>300.000</td>
<td>325.000</td>
<td>350.000</td>
<td>7</td>
<td>138</td>
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<tr>
<td>13</td>
<td>Gurame</td>
<td>40.300</td>
<td>42.300</td>
<td>44.400</td>
<td>46.600</td>
<td>48.900</td>
<td>5</td>
<td>127</td>
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<tr>
<td>14</td>
<td>Seabass</td>
<td>5.000</td>
<td>5.500</td>
<td>6.500</td>
<td>7.500</td>
<td>8.500</td>
<td>13</td>
<td>185</td>
</tr>
<tr>
<td>15</td>
<td>Grouper</td>
<td>7.000</td>
<td>9.000</td>
<td>11.000</td>
<td>15.000</td>
<td>20.000</td>
<td>31</td>
<td>377</td>
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<tr>
<td>16</td>
<td>Others</td>
<td>646.700</td>
<td>738.800</td>
<td>925.400</td>
<td>1.032.700</td>
<td>1.038.700</td>
<td>14</td>
<td>188</td>
</tr>
</tbody>
</table>

Ket: *) estimated value
### Export volume and value of fisheries product 2004-2008

<table>
<thead>
<tr>
<th>Volume/Value</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>%/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>907.970</td>
<td>857.922</td>
<td>926.478</td>
<td>854.328</td>
<td>911.674</td>
<td>0.35</td>
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<tr>
<td>- Shrimp</td>
<td>142.135</td>
<td>153.906</td>
<td>169.329</td>
<td>157.545</td>
<td>170.583</td>
<td>4.90</td>
</tr>
<tr>
<td>- Tuna/Skipjack</td>
<td>94.221</td>
<td>91.631</td>
<td>91.822</td>
<td>121.316</td>
<td>130.056</td>
<td>9.20</td>
</tr>
<tr>
<td>- Other fish (including freshwater fish)</td>
<td>515.834</td>
<td>428.395</td>
<td>493.540</td>
<td>393.679</td>
<td>424.401</td>
<td>(3.54)</td>
</tr>
<tr>
<td>- Crab</td>
<td>20.903</td>
<td>18.593</td>
<td>17.905</td>
<td>21.510</td>
<td>20.713</td>
<td>0.42</td>
</tr>
<tr>
<td>- others</td>
<td>134.877</td>
<td>165.397</td>
<td>153.881</td>
<td>160.279</td>
<td>165.923</td>
<td>5.84</td>
</tr>
<tr>
<td>Value (1.000 US$)</td>
<td>1.784.010</td>
<td>1.913.305</td>
<td>2.103.471</td>
<td>2.258.920</td>
<td>2.699.683</td>
<td>11.02</td>
</tr>
<tr>
<td>- Shrimp</td>
<td>892.479</td>
<td>948.130</td>
<td>1.115.963</td>
<td>1.029.935</td>
<td>1.165.293</td>
<td>7.34</td>
</tr>
<tr>
<td>- Tuna/Skipjack</td>
<td>243.938</td>
<td>246.303</td>
<td>250.567</td>
<td>304.348</td>
<td>347.189</td>
<td>9.56</td>
</tr>
<tr>
<td>- Other fish (including freshwater fish)</td>
<td>357.022</td>
<td>366.414</td>
<td>449.812</td>
<td>568.420</td>
<td>734.392</td>
<td>20.24</td>
</tr>
<tr>
<td>- Crab</td>
<td>14.355</td>
<td>130.905</td>
<td>134.825</td>
<td>179.189</td>
<td>214.319</td>
<td>216.85</td>
</tr>
<tr>
<td>- others</td>
<td>156.216</td>
<td>221.553</td>
<td>152.305</td>
<td>177.028</td>
<td>238.490</td>
<td>15.38</td>
</tr>
</tbody>
</table>
VISION

REALIZING INDONESIA AS THE BIGGEST MARINE AND FISHERIES PRODUCT PRODUCER 2015 THROUGH ADVANCE, COMPETITIVE, SUSTAINABLE, AND EQUITABLE AQUACULTURE
MISSION

PROSPERING MARINE AND FISHERIES COMMUNITY THROUGH:

• PROVIDING FISH BASED FOOD FOR COMMUNITIES IN ORDER TO SUPPORT NATIONAL FOOD SECURITY

• DEVELOPING MULTI BUSINESS SCALE AQUACULTURE THAT PROFITABLE, EFFICIENT AND ENVIRONMENTALLY FRIENDLY

• CREATING AQUACULTURE THAT OPEN BUSINESS OPPORTUNITY, ABSORBING WORK FORCE, AND PRODUCING FISH MATCHING WITH MARKET DEMAND, FOOD AND INDUSTRY NEEDS
GOALS

• TO INCREASE COMMUNITY NUTRITION THROUGH CONSUMING AQUACULTURE PRODUCT

• TO PROTECT, REHABILITATE, AND CONSERVE AQUACULTURE RESOURCE

• TO INCREASE FOREIGN EXCHANGE EARNING, INCOME, AND CREATE JOB OPPORTUNITY AS WELL AS BUSINESS OPPORTUNITY
1. **Increase the fish farmers awareness on quality assurance and food safety**
   - Providing information on the important of quality assurance and food safety as well as the government program on that issues

2. **Improve capacity building for officials (TOT) and fish farmers**
   - Training and educating farmers; classroom, demonstration farms, mentoring

3. **Enforce regulations on quality control and safety assurance towards all stakeholders throughout Indonesia**
   - Imposing temporary ban of exporting product which is non compliance
4. **Implement aquaculture certification program**
   
   - Establish a Competent Authority (CA) for certification in fisheries and a Quality System Certification Institution for certification in aquaculture
   
   - Good Hatchery Practices Certification: 52 Certified Hatchery
   
   - Good Aquaculture Practices Certification on Farms: 290 Certified Fish Farms

5. **Enforce to Use the registered fish drugs and feed**
   
   - Registration of veterinary drugs: 150 registered drugs
   
   - Registration of feed: 281 registered brands
6. **Optimizing Directorate General of Aquaculture’s laboratories capability**
   - Laboratory accreditation based on ISO. 17025: 5 laboratories
   - Laboratory accreditation based on ISO. 17021: 2 laboratories

7. **Optimizing the Residue Monitoring Program (RMP), particularly on heavy metal and antibiotic residue**
   - National Residue Control Plan (NRCP)
   - Immediate Inspections (no prior notification inspection)
The Indonesian Certification system has been fulfilled the minimum requirement from the FAO guidelines for aquaculture certification, comprising:

- Food safety & traceability
- Environment integrity
- Social-economic aspect
- Animal health and welfare
The Indonesian certification assessment including:

- Risk prevention in every production steps, including site selection, farm preparation, water management, feed and feeding, drugs and chemical usage;
- Sanitation fulfillment
- Data availability and updating
- Capacity building for fish farmers (training needs assessment survey conducted prior to identify the needs of farmers)
1. Minister MAF Regulation No: PER. 01/MEN/2007 regarding Quality Control and Food Safety Systems for Fishery Products

2. Minister MAF Regulation No: PER.02/MEN/2007 regarding the Monitoring of Drug, Chemicals, Biological Residues on Aquaculture Practices

3. Minister MAF Regulation No: KEP.01/MEN/2007 regarding Regulations for Quality Control and Food Safety of Fishery Products during Production, Processing and Distribution


7. Minister MAF No. PER.02/MEN/2010 regarding regulation on Feed Procurement and Distribution
QUALITY ASSURANCE AND FOOD SAFETY SYSTEM IN INDONESIAN AQUACULTURE PRODUCT

1. GAP
2. GHcP
3. NRCP
4. Fishing boat
5. CA (DJPT): Certification, inspection & verification
6. Registration for boat certification: SKPP
7. Fish landing
8. Monitoring
9. Capture Fisheries
10. Aquaculture
11. Fish feed and drugs
12. Agent (Supplier)
13. CA (P2HP) Central and local Gov: Inspection & verification
14. Fisheries Processing Unit
15. Fishing Port
16. Agen (Supplier) / Mini Plant
17. LPPMHP > Surveillance In Process Inspection And test the end product
19. Domestic and International Market

Certification: SKP: GMP & SSOP HACCP Traceability
GAP CERTIFICATION PROCEDURES

1. APPLICATION
   FORWARD TO PROV/DISTRICT FISHERIES SERVICES (fl001)

2. ASSIGN INSpectors
3. INSPECTION
4. INSPECTION REPORT
5. DISCUSSION
6. RECOMMENDATION
7. ISSUE OF GAP Certificate
8. ANNUAL VERIFICATION
9. VERIFICATION ANNUAL REPORT

DIRECTOR GENERAL for AQUACULTURE

APPROVAL COMMISION

AUDITOR

FARMS AQUACULTURE
IMPLEMENTATION OF THE FISH DRUG RESIDUE MONITORING PROGRAM

1. Mapping and Plotting of aquaculture areas
2. Field Observations and sampling
3. Immediate Inspections (no prior notification)
4. Laboratory testing of samples
5. Reporting of monitoring results
6. Evaluation, Surveillance and Follow-up Measures

A Vehicle used for mobile laboratory
SUPPORTING FISH DRUG RESIDUE MONITORING PROGRAM

a. Increasing the facilities available in central technical implementation unit (TIU) laboratories

b. Increasing the facilities available in provincial/district environmental laboratories

c. Improving co-operation with other laboratories
FLOW CHART OF THE PROCESS FOR MONITORING (SAMPLING) AND TESTING RESIDUES AND CONTAMINANTS

1. Provincial Fisheries Services
2. Directorate General of aquaculture
3. Provincial Monitoring Team
4. DGA monitoring & evaluating team
5. Appointed Laboratories

- Brackishwater ponds
- Freshwater ponds
- Floating cages

CA Buyer
WAYS OF DELIVERING INFORMATION

• CLASSROOM
• DEMONSTRATION FARMS
• MENTORING (EMPLOYING EXTENSION WORKERS)
Training and Educating Farmers through Classroom

- Limited participation due to farmers value their time higher in their farms than in the classroom sitting for training.
- Poor transferring knowledge process from expert (scientist) to the farmers due to low farmers education level.
- Communication constraints due to limitation on understanding formal academia and technical term commonly used in classroom.
Training and Educating Farmers through Classroom (Continued...)

• Classroom situation tend to be formal for the farmers and makes them shy to ask questions.
• The farmers should be from relatively similar scale of business so each other feels comfortable in sharing ideas during training.
• Easily covering various topics in a relatively tight schedule supported by proper audio visual aid.
Training and Educating Farmers through Demonstration Farms

- Demonstration farms are more effective than the classroom method because they help farmers to have faster and better understanding on the training material.

- Even though some farmers might not understand the academia and technical terms properly, physical demonstration help them to understand the training material easily.
If the demonstration farms construction is highly expensive, however, farmers are reluctant to implement their knowledge gained from their training due to limited capital.

Farmers tend to be voluntary to participate and have easy feeling to ask questions.
Training and Educating Farmers through Mentoring

- It has been implemented for a long time through employing extension workers.
- Mentoring is conducted through individual or small group basis.
- The effectiveness of message transfer is influenced by how good the knowledge of the extension workers and how good the relationship built between the farmers and the extension workers.
SUMMARY

- To minimize food Safety Concern with Aquaculture Products in Indonesia:
  - Delivering information on existing regulatory system to the farmers.
  - Training and educating farmers through: classroom, demonstration farms and mentoring.
Recommendation

- To achieve high effectiveness in training and educating farmers it is necessary to conduct earlier needs assessment survey in order to identify the needs of farmers.
- The three ways of delivering information to the farmers are good to implement depending on training material, geographic condition and budget allocation.
Thank for Your Attention